MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2022/2023

BFN2254 – FINANCIAL STATISTICAL ANALYSIS

(All sections / Groups)

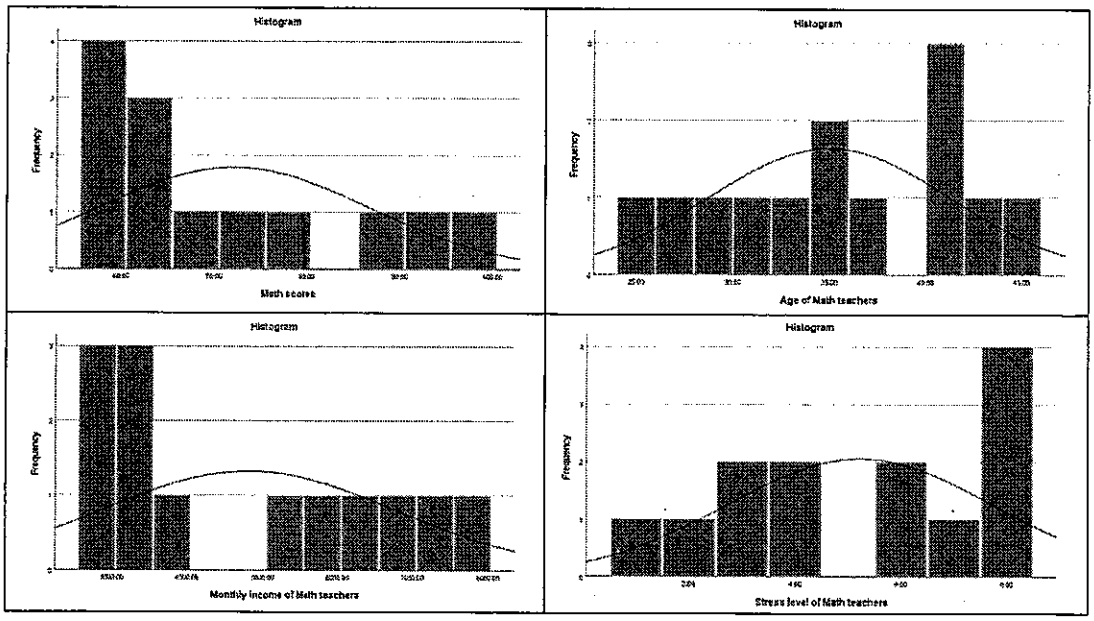
10 JULY 2023
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **SEVEN (7)** printed pages inclusive of the cover page.
2. Answer **ALL** four questions in answer booklet provided.
3. All necessary workings to be shown for marks given.
4. Marks are shown at the end of each question.

Question 1 [20 marks]

The administrator of a school board in a large country was analysing the average mathematics test scores of secondary school students. She noticed that there were dramatic differences in scores among the schools. In an attempt to improve the Mathematics scores of all schools, she would like to determine the factors that caused the differences. Suspected factors are age, monthly income and stress level (Likert scale from 1-not stressful at all to 10-extremely stressful) of Mathematics teachers. SPSS outputs from the analysis of 13 schools are presented as below.



Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Math scores	.227	13	.064	.861	13	.040
Age of Math teachers	.170	13	.200*	.958	13	.717
Monthly income of Math teachers	.258	13	.018	.848	13	.026
Stress level of Math teachers	.172	13	.200*	.891	13	.099

			Math scores	Age of Math teachers	Monthly income of Math teachers	Stress level of Math teachers
Kendall's tau_b	Math scores	Correlation Coefficient	1.000	-.013	.579**	-.566*
		Sig. (2-tailed)	.	.951	.007	.010
		N	13	13	13	13

Continued...

(a) Discuss the skewness of each variable graphically. [2 marks]
(b) Check on the Normality for each variable at 5% significant level. [8 marks]
(c) Test for relationship between Math scores with each of the suspected factors. [10 marks]

Question 2 [30 marks]

(a) How effective are antilock brakes, which pump very rapidly rather than lock and thus avoid skids? As a test, a car dealer set up for an experiment. He hit the brakes and recorded the number of seconds it took to stop an ABS-equipped car and repeat the experiment to another identical car without ABS at the same speed. The tests are repeated at different speeds for both types of cars. The partial SPSS output of the analysis is reported below.

Statistics

		with ABS	non-ABS
N	Valid	8	8
	Missing	0	0
Mean		5.4625	5.6375
Median		5.6000	5.9500
Std. Deviation		1.22933	1.39789

	Mean	Std. Deviation	Std. Error Mean	t	df	One-Sided p	Two-Sided p
with ABS - non-ABS	-.17500	.22520	.07962	-2.198	7	.032	.064

(i) Does the analysis involve independent samples or related samples? Justify your answer. [2 marks]
(ii) Interpret the mean and median of stopping time for both types of cars. [4 marks]
(iii) Which of the data shall be tested for Normality? Explain. [2 marks]
(iv) Assuming the data is Normally distributed, can we conclude that there is significant difference in stopping time for both type of cars at 5% level of significance? [5 marks]
(v) At 10% level of significance, what kind of conclusion can be reached? [5 marks]

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(b) Dr. Chong would like to investigate the degree of preference for k-drama among MMU students from different gender. Each student was asked to rate their preference of k-drama in a 10-point Likert-scale with 1 stands for extremely dislike and 10 stands for extremely like. The SPSS output for the analysis is presented below.

Case Processing Summary

		Cases					
		Valid		Missing		Total	
	Gender	N	Percent	N	Percent	N	Percent
Preference	Female	18	100.0%	0	0.0%	18	100.0%
	Male	14	100.0%	0	0.0%	14	100.0%

Ranks

	Gender	N	Mean Rank	Sum of Ranks
Preference	Female	18	21.06	379.00
	Male	14	10.64	149.00
	Total	32		

Test Statistics[a]

	Preference
Mann-Whitney U	44.000
Wilcoxon W	149.000
Z	-3.156
Asymp. Sig. (2-tailed)	.002
Exact Sig. [2*(1-tailed Sig.)]	.001[b]

(i) Does the analysis involve independent samples or related samples? Justify your answer. [2 marks]

(ii) Explain why a non-parametric test should be conducted for this study? [1 mark]

(iii) List down any assumption(s) needed for the test in (ii) to be conducted. [1 mark]

(iv) At 5% level of significance, can we conclude that there is a significant difference in preference rating of k-drama between female and male MMU students? [8 marks]

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Question 3 [35 marks]

One particular morning, the length of time spent in the examination rooms is recorded for each patient seen by each of the four physicians at an orthopedic clinic. The chief of the orthopedic clinic would like to investigate whether there is any difference in examination time by these four physicians. The SPSS output of the analysis is presented below.

Tests of Normality

		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Physician	Statistic	df	Sig.	Statistic	df	Sig.
Examination time	Physician 1	.175	7	.200*	.927	7	.529
	Physician 2	.269	6	.200*	.880	6	.271
	Physician 3	.214	8	.200*	.951	8	.723
	Physician 4	.266	6	.200*	.889	6	.312

	N	Mean	Std. Deviation
Physician 1	7	28.2857	4.88925
Physician 2	6	38.6667	7.71146
Physician 3	8	28.6250	6.32314
Physician 4	6	30.3333	3.66970
Total	27	31.1481	6.90431

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
Examination time	Based on Mean	1.191	3	23	.335
	Based on Median	1.052	3	23	.389
	Based on Median and with adjusted df	1.052	3	19.032	.393
	Based on trimmed mean	1.189	3	23	.336

ANOVA

Examination time

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	451.437	3	150.479	4.392	.014
Within Groups	787.970	23	34.260		
Total	1239.407	26			

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Robust Tests of Equality of Means

Examination time

	Statistic[a]	df1	df2	Sig.
Welch	2.648	3	12.271	.095
Brown-Forsythe	4.401	3	17.103	.018

Multiple Comparisons

Dependent Variable: Examination time

Tukey HSD

(I) Physician	(J) Physician	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Physician 1	Physician 2	-10.38095*	3.25640	.020	-19.3924	-1.3695
	Physician 3	-.33929	3.02930	.999	-8.7223	8.0437
	Physician 4	-2.04762	3.25640	.922	-11.0591	6.9638
Physician 2	Physician 1	10.38095*	3.25640	.020	1.3695	19.3924
	Physician 3	10.04167*	3.16107	.020	1.2940	18.7893
	Physician 4	8.33333	3.37933	.093	-1.0183	17.6850
Physician 3	Physician 1	.33929	3.02930	.999	-8.0437	8.7223
	Physician 2	-10.04167*	3.16107	.020	-18.7893	-1.2940
	Physician 4	-1.70833	3.16107	.948	-10.4560	7.0393
Physician 4	Physician 1	2.04762	3.25640	.922	-6.9638	11.0591
	Physician 2	-8.33333	3.37933	.093	-17.6850	1.0183
	Physician 3	1.70833	3.16107	.948	-7.0393	10.4560

*. The mean difference is significant at the 0.05 level.

(a) Determine whether a parametric or non-parametric test should be performed for this study. Justify your answer. [10 marks]

(b) Name the appropriate analysis as explained in (a). [1 mark]

(c) Is the homogeneity of variances assumption fulfilled? Explain. [5 marks]

(d) At 5% significance level, can we conclude that there is significant difference in terms of examination time among four physicians in the clinic? [5 marks]

(e) Explain the findings from the post-hoc test at 10% significance level. [14 marks]

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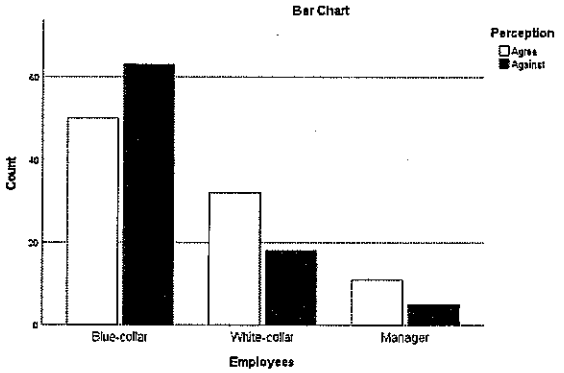
Question 4 [15 marks]

(a) Differentiate the function between Chi-square goodness-of-fit test and Chi-square test of independence. [2 marks]

(b) The human capital manager would like to explore the perception among employees on the proposal of mandatory exercise session at office once a week. Employees from three categories (blue-collar, white-collar and manager) were asked whether they agree or against about the proposal.



Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.403[a]	2	.025
Likelihood Ratio	7.504	2	.023
Linear-by-Linear Association	6.769	1	.009
N of Valid Cases	179		

		Value	Approximate Significance
Nominal by Nominal	Phi	.203	.025
	Cramer's V	.203	.025
N of Valid Cases		179	

(i) Discuss the findings from the bar chart. [3 marks]

(ii) At 5% significance level, what can you conclude from the Chi-Square test above? [5 marks]

(iii) Test the strength of association between acceptance level and employee categories using the Phi test. [5 marks]

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